

only under light irradiation to form a redox pair and showing a proton migration in such redox pair under the application of an electric field, as disclosed in the Japanese Patent

ct Application Laid-open No. 2-98849.--

IN THE CLAIMS

Please cancel Claims 6 and 8 without prejudice and without disclaimer of subject matter.

Please amend Claims 1, 10-12, 14 and 16-19 to read as follows (a version of Claims 1, 10-12, 14 and 16-19 marked up to show the changes is submitted herewith):

1. (Amended) A probe for detecting light or irradiating light, comprising:
a cantilever supported at an end thereof by a substrate;
a hollow tip formed at a free end of said cantilever;
a microaperture formed at the end of said tip;
a hollow waveguide formed inside said cantilever; and
a mirror at an end of said hollow waveguide at the tip side, wherein the direction of the end of said substantially perpendicular to the longitudinal direction of said cantilever, and said mirror reflects the light entering from the microaperture toward the hollow waveguide or reflects the light transmitted in said hollow waveguide toward said microaperture.

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2. (Not Currently Amended) The probe according to claim 1, wherein said waveguide has a V-shaped transversal cross section.

3. (Not Currently Amended) The probe according to claim 1, wherein said waveguide has a trapezoidal transversal cross section.

4. (Not Currently Amended) The probe according to claim 1, wherein said waveguide has a U-shaped transversal cross section.

5. (Not Currently Amended) The probe according to claim 1, wherein said tip is shaped as a square cone.

7. (Not Currently Amended) The probe according to claim 1, wherein said cantilever is principally composed of silicon.

9. (Not Currently Amended) The probe according to claim 1, wherein said mirror is a concave mirror.

10. (Amended) A method for producing a probe for light detection or light irradiation, which comprises the steps of:

working a substrate to form a groove and a mirror at an end of the groove therein,

forming a flat plate-shaped cover portion on the groove to form a hollow waveguide having an opening in a part thereof,

forming a hollow tip having a microaperture on the opening, and
removing a part of the substrate by etching, to form a cantilever.

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11. (Amended) The method according to claim 10, wherein said groove
and said mirror are formed by etching said substrate.

12. (Amended) The method according to claim 11, wherein said groove
and said mirror are formed by crystal-anisotropic etching of said substrate.

13. (Not Currently Amended) The method according to claim 10,
further comprising a surface treatment step of forming said groove or said cover portion
into a mirror surface state.

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14. (Amended) The method according to claim 10, wherein said cover
portion is formed from an SOI (silicon on insulator) layer of an SOI substrate.

15. (Not Currently Amended) The method according to claim 10,
wherein said cover portion is formed by filling said groove with a resin layer and forming a
metal film on said resin layer.

16. (Amended) The method according to claim 10, wherein said step of
forming said hollow tip having said microaperture on said opening comprises the steps of:
forming a film of a tip material on a recess formed on a substrate,
transferring the tip material onto the opening, and

etching the end of a hollow tip resulting from the transferring step to form the microaperture.

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17. (Amended) The surface observation apparatus provided with at least one probe selected from the group consisting of probes according to any one of claims 1 to 5, 7 and 9.

18. (Amended) An exposure apparatus provided with at least one probe selected from the group consisting of probes according to any one of claims 1 to 5, 7 and 9.

19. (Amended) An information processing apparatus provided with at least one probe selected from the group consisting of probes according to any one of claims 1 to 5, 7 and 9.

Please add Claims 20-23 as follows:

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--20. (New) The surface observation apparatus provided with at least one probe selected from the group consisting of probes produced by a method according to any one of claims 10 to 16.

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21. (New) An exposure apparatus provided with at least one probe selected from the group consisting of probes produced by a method according to any one of claims 10 to 16.